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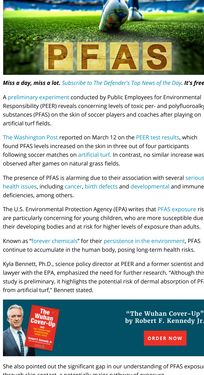
Kids Especially at Risk: 3 of 4 Athletes Test Positive for PFAS After Playing on Artificial Turf

According to the EPA, PFAS exposure is particularly concerning for young children, who are more susceptible due to their developing bodies and at risk for higher levels of exposure from daily activities. PFAS, which continue to accumulate in the human body, pose long-term health risks.

By Beyond Pesticides



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A preliminary experiment conducted by Public Employees for Environmental Responsibility (PEER) reveals concerning levels of toxic per- and polyfluoroalkyl substances (PFAS) on the skin of soccer players and coaches after playing on artificial turf fields.

The Washington Post reported on March 12 on the PEER test results, which found PFAS levels increased on the skin in three out of four participants following soccer matches on artificial turf. In contrast, no similar increase was observed after games on natural grass fields.

The presence of PFAS is alarming due to their association with several serious health issues, including cancer, birth defects and developmental and immune deficiencies, among others.

The U.S. Environmental Protection Agency (EPA) writes that PFAS exposure risks are particularly concerning for young children, who are more susceptible due to their developing bodies and at risk for higher levels of exposure than adults.

Known as "forever chemicals" for their persistence in the environment, PFAS continue to accumulate in the human body, posing long-term health risks.

Kyla Bennett, Ph.D., science policy director at PEER and a former scientist and lawyer with the EPA, emphasized the need for further research. "Although this study is preliminary, it highlights the potential risk of dermal absorption of PFAS from artificial turf," Bennett stated.

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She also pointed out the significant gap in our understanding of PFAS exposure through skin contact, a potentially major pathway of exposure.

Larger scale scientific studies are currently underway, as The Washington Post noted, "Wayne State University researchers are preparing to conduct a study on whether the chemicals found in turf can affect the endocrine system."

"If the intent was to spread PFAS contamination across the globe, there would be few more effective methods than lacing pesticides with PFAS," said Bennett.

Her remarks underscore the significant environmental impacts as these chemicals can leach into surrounding surface and groundwater, posing a threat to drinking water sources.

In addition, broader scientific impacts are a concern in the direct contamination of water.

As Beyond Pesticides reported, PFAS persistence is due to a fluorine-carbon atom bond being among the strongest ever created.

PFAS contamination of drinking water, surface and groundwater, waterways, soils and the food supply, among other resources, is a ubiquitous and concerning contaminant across the globe.

With health risks including developmental and endocrine system disruption, reproductive harm, cancer and damage to the liver, kidney and respiratory system, PFAS presents a chronic danger that demands action.

According to Dianne Woelke, a retired nurse and member of Safe Healthy Play Fields, "PFAS chemicals are so toxic that they are measured in parts per trillion," Woelke said. "For every 80,000 square feet of plastic turf, there is between one and 38 pounds of various PFAS chemicals."

She further elaborates on the toxicity of the tire crumbs in between the synthetic blades of turf — found to contain over 350 chemicals. "Parents need to be made aware... just because a consumer product has been made for sale does not mean it is safe."

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States and local communities are taking action

The U.S. has an estimated 12,000 to 13,000 synthetic turf sports fields, with over a thousand new installations each year.

Activists have sparked increased efforts to limit or remove artificial turf from various settings, including schools, parks and professional sports arenas, spurring states and local governments to take action.

New York has banned the sale of artificial turf with PFAS, starting at the end of 2026, and recognizes that recycling artificial turf can be a greenwashing fallacy (see NRDC 2022).

Bills prohibiting the purchase of new artificial turf fields in select locations, such as schools, have also been introduced in Massachusetts and Vermont.

In addition, California passed a 2023 bill banning the sale of PFAS-containing artificial turf, but it was not signed into law last year by Governor Gavin Newsom, who sought stronger enforcement and signaled that the issue could return in this legislative year.

Newsom did allow cities and counties to ban artificial turf that contains PFAS via a new law reversing a previous law preventing, or preempting, local governments from banning artificial turf.

As the Times of San Diego reported in October 2023, some California cities have already begun moving to prohibit synthetic lawns, including Millbrae in San Mateo County and San Marino in Los Angeles County.

"Emerging research is making it clear that artificial turf poses an environmental threat due to its lack of recyclability and presence of toxins such as lead and PFAS," said state Senator Ben Allen, a Redondo Beach Democrat who authored the state bill.

With the new law, "Local governments will again be able to regulate artificial turf in a way to both protect our environment in the face of drought and climate change but also by preventing further contribution to our recycling challenges and toxic runoff," he said.

Organically managed natural grass is an overlooked solution

Beyond Pesticides and local advocates are fighting with a campaign to bring organically maintained natural grass into the ongoing discussions about artificial turf use.

Cortney Jansen, a concerned parent from Sunnyvale, California, expressed her views to the Fremont Union High School District regarding this matter.

Despite concerns, the district has agreed to replace six fields with new synthetic turf.

(A notable conflict of interest, highlighted by the situation in Sunnyvale — the landscape consultant and construction firm engaged to provide impartial advice on turf replacement was the same entity granted a $14.5 million contract to carry out the work. This consultant was initially tasked with evaluating various alternatives for the replacement of 12 artificial turf fields due for removal before reaching their expected lifespan of eight to ten years.)

Testing for PFAS in artificial turf

Testing for PFAS in water is well-defined. For an in-depth discussion that explains the science for a non-science audience, please see Toxics Use Reduction Institute (TURI) at the University of Massachusetts Lowell fact sheet, Per- and Poly-fluoroalkyl Substances (PFAS) in Artificial Turf Carpet.

As TURI notes, testing for PFAS presents significant challenges due to the vast number of compounds within this class and their ability to cause adverse effects at very low concentrations.

While testing methods for drinking water and wastewater have been developed, there is a lack of standardized guidelines for assessing PFAS in solid materials, such as artificial turf components.

One important way to overcome these challenges includes developing techniques for assessing the total concentration of fluorine-containing organic compounds, which do not specifically target PFAS but indicate their presence.

The importance of fluorine analysis as a proxy to measure the presence of PFAS is recognized by 20 states and is the subject of Maryland's proposed HB1190 bill that would ban pesticides that contain PFAS. Read Beyond Pesticides' call to action and testimony.

Does the synthetic turf industry know this and harken back to the tobacco industry's playbook?

In an email to The Washington Post, Melanie Taylor, the president and chief executive of the Synthetic Turf Council (STC), a trade association for the industry, pointed to the tests showing the presence of PFAS in soil.

"STC has worked with its members to ensure their products contain no intentionally added PFAS constituents," Taylor said.

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Advocates note that the real explanation for PFAS-contaminated soil could be from pesticides containing PFAS commonly used on conventional natural grass turf, the same PFAS-containing pesticides that are the subject of Maryland's proposed ban.

Given the extreme toxicity of PFAS, its alarming ubiquity, its persistence and the cost of remediating contaminated drinking water, there is an urgent need to do all we can to stop adding it to the environment.

As the federal government has been slow to regulate the industry, local residents and communities have taken up the call to eliminate the use of PFAS. One impactful area that can be addressed at this level is land management.

A common and dangerous misconception is that the options for community athletic fields are limited to synthetic turf or synthetically managed natural turf. This is a false dichotomy.

There is a third option that avoids both sources of PFAS: organically managed natural turf. Organic management practices build soil health, cycle nutrients naturally, enhance turf resiliency, reduce water use and do not use petrochemical pesticides or fertilizers.

The organic alternative is central to a community's discussion about its residents' commitment to the elimination of practices and products that are petrochemical-based and the ability of organically managed soils to draw down (sequester) atmospheric carbon as a reasonable price point — even factoring in water and labor costs.

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Beyond Pesticides
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